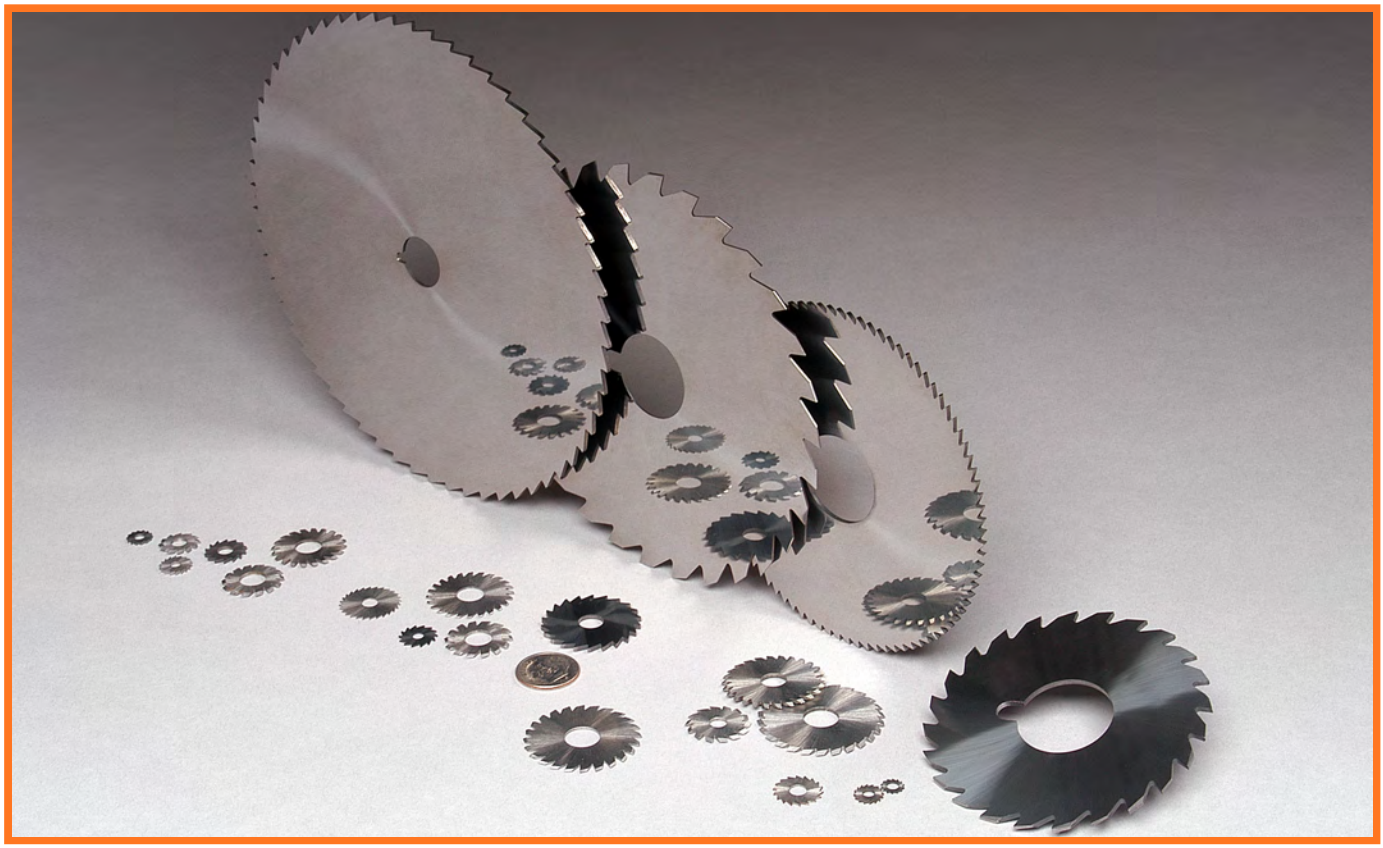
MARTINDALE

Saws

Solid Carbide

- Cut-Off
- Slotting / Slitting
- Screw Slotting
- Jeweler's
- Joyal®
- Copper Notching & Slitting

High-Speed Steel



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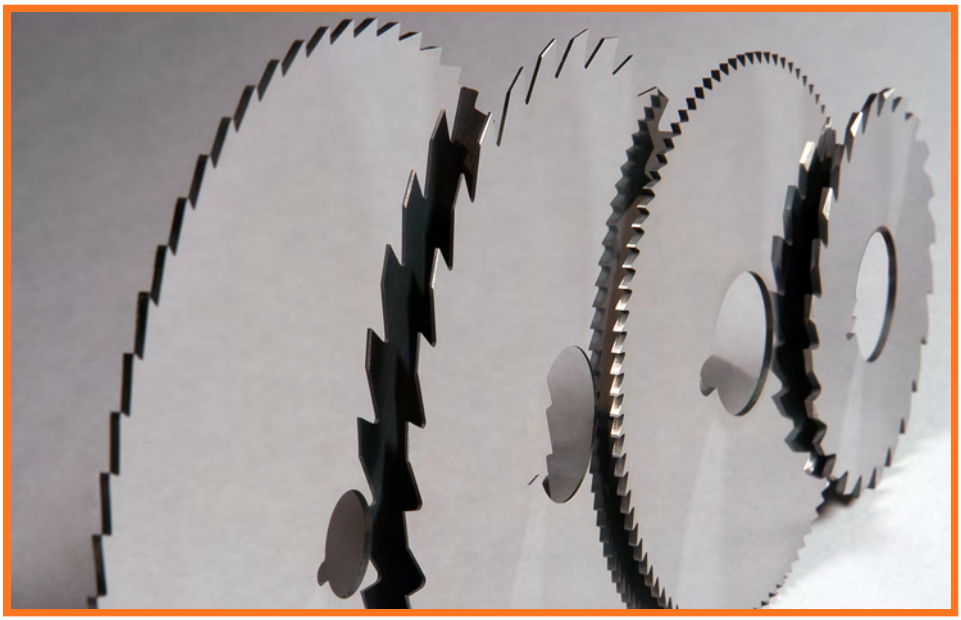
02/05

Over 100 Years of Service.

Martindale Electric Co. started in the electric motor maintenance tool manufacturing business in 1913. From the start, we put emphasis on quality materials and workmanship — and on dedicated customer service.



Our approach worked. We prospered and grew. Gradually, we added new products to our line, including mica undercutting saw blades. This saw blade line eventually grew to what it is today.

Martindale is stocked and staffed to promptly meet your sawing needs. Each and every employee adheres to the standards of product quality and customer service that has kept us the one stop shop for circular saw blades and electric motor repair tools for more than 100 years!

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02/14

CIRCULAR SAW BLADE CONTENTS

Page No.

- Arbors, Saw 12
- Copper Notching and Slitting Saws:
  - High-Speed Steel 6
  - Carbide, Solid 8
- Cut-Off Saws:
  - Carbide, Solid 9
- Helpful Hints for Saw Users (Metal-Working Saws) . . . . . 13 - 14
- Helpful Hints for Saw Users (Mica Undercutting Saws & V-Cutters) . . . . . 14 - 16
- Jeweler's Saws:
  - High-Speed Steel 5
- Joyal® Saws:
  - High-Speed Steel 6
  - Carbide, Solid 8
- Mica Undercutting Saws & V-Cutters:
  - High-Speed Steel 10
  - Carbide, Solid 11
- Saw Arbors 12
- Saw Sharpening Wheel 12
- Saws, Carbide, Solid:
  - Copper Notching and Slitting 8
  - Cut-Off 9
  - Joyal® 8
  - Mica Undercutting 11
  - Slitting / Slotting 8
- Saws, Cut-Off:
  - Carbide, Solid 9
- Saws, High-Speed Steel:
  - Copper Notching and Slitting 6
  - Jeweler's 5
  - Joyal® 6
  - Mica Undercutting 10
  - Screw Slotting 4
  - Slitting / Slotting . . . . . 4 - 5
- Saws, Jeweler's:
  - High-Speed Steel 5
- Saws, Riser Slotting / Copper Slitting:
  - High-Speed Steel 6
  - Carbide, Solid 8
- Screw Slotting Saws 4
- Sharpening Wheel, Saw 12
- Undercutting Saws & V-Cutters, Mica:
  - High-Speed Steel 10
  - Carbide, Solid 11
- Slitting / Slotting Saws:
  - High-Speed Steel . . . . . 4 - 5
  - Carbide, Solid . . . . . 7 - 9
- Washers, Support 9
- Wheel, Saw Sharpening 12

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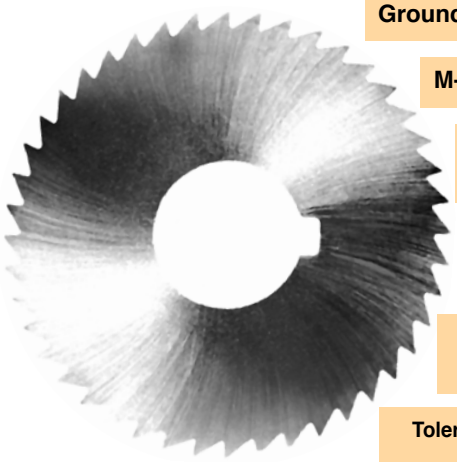
TYPE SS SCREW SLOTTING SAWS

Used for cutting-off, slitting and slotting of Steel. (Similar to slots in screw heads).



Ground Teeth

M-2 High Speed Steel

Hollow Ground For Side Clearance

Rake Angle of Teeth: 0°

Metric Sizes Available

NOTE:
Saws in schedule are stocked for immediate shipment. For thicknesses not shown, use next higher price in schedule (plus a slight grinding charge for smaller quantities).
Other diameters from 1/4" to 6" are also available, as well as other hole sizes, numbers of teeth, rake angles and bevels.
Cutting Stainless Steel requires more side clearance — specify "for stainless" when ordering.
Specify number of teeth when ordering.

Tolerances: O.D. ±.005; Thickness ±.001; I.D. +.001 -.000
Closer tolerances available at additional cost.

RESHARPENING SERVICE
Complete resharpening service is available.
Prices on application.

COATING SERVICE
TiN, TiCN and other surface coatings are available.
Prices on application.

SAWS AVAILABLE IN M-42 MATERIAL, UPON REQUEST

STOCK SAWS

Thickness		O.D.	1-3/4"	2-1/4"	2-3/4"	3"	4"	5"	6"
B&S Gage No. and Fraction	Decimal	Hole	5/8"	5/8"	1"□	1"	1"	1"	1"
		No. of Teeth	64, 90	60	36, 44 56, 72	36, 44 56, 72	60, 72 90	60, 72 90, 110	72, 90 120
3/16"	.187"				OSSC187	OSSD187	OSSE187	OSSF187	OSSG187
5	.182"				OSSC182	OSSD182	OSSE182	OSSF182	OSSG182
11/64"	.172"				OSSC172	OSSD172	OSSE172	OSSF172	OSSG172
6	.162"				OSSC162	OSSD162	OSSE162	OSSF162	OSSG162
5/32"	.156"				OSSC156	OSSD156	OSSE156	OSSF156	OSSG156
7	.144"				OSSC144	OSSD144	OSSE144	OSSF144	OSSG144
9/64"	.141"				OSSC141	OSSD141	OSSE141	OSSF141	OSSG141
8	.128"				OSSC128	OSSD128	OSSE128	OSSF128	OSSG128
1/8"	.125"			OSSB125	OSSC125	OSSD125	OSSE125	OSSF125	OSSG125
9	.114"			OSSB114	OSSC114	OSSD114	OSSE114	OSSF114	OSSG114
7/64"	.109"			OSSB109	OSSC109	OSSD109	OSSE109	OSSF109	OSSG109
10	.102"			OSSB102	OSSC102	OSSD102	OSSE102	OSSF102	OSSG102
3/32"	.094"			OSSB094	OSSC094	OSSD094	OSSE094	OSSF094	OSSG094
11	.091"			OSSB091	OSSC091	OSSD091	OSSE091	OSSF091	OSSG091
12	.081"			OSSB081	OSSC081	OSSD081	OSSE081	OSSF081	OSSG081
5/64"	.078"			OSSB078	OSSC078	OSSD078	OSSE078	OSSF078	OSSG078
13	.072"		OSSA072	OSSB072	OSSC072	OSSD072	OSSE072	OSSF072	OSSG072
14	.064"		OSSA064	OSSB064	OSSC064	OSSD064	OSSE064	OSSF064	OSSG064
1/16"	.062"		OSSA062	OSSB062	OSSC062	OSSD062	OSSE062	OSSF062	OSSG062
15	.057"		OSSA057	OSSB057	OSSC057	OSSD057	OSSE057	OSSF057	OSSG057
16	.051"		OSSA051	OSSB051	OSSC051	OSSD051	OSSE051	OSSF051	OSSG051
3/64"	.047"		OSSA047	OSSB047	OSSC047	OSSD047	OSSE047	OSSF047	OSSG047
17	.045"		OSSA045	OSSB045	OSSC045	OSSD045	OSSE045	OSSF045	OSSG045
18	.040"		OSSA040	OSSB040	OSSC040	OSSD040	OSSE040	OSSF040	OSSG040
19	.036"		OSSA036	OSSB036	OSSC036	OSSD036	OSSE036		
20	.032"		OSSA032	OSSB032	OSSC032	OSSD032	OSSE032		
1/32"	.031"		OSSA031	OSSB031	OSSC031	OSSD031	OSSE031		
21	.028"		OSSA028	OSSB028	OSSC028	OSSD028	OSSE028		
22	.025"		OSSA025	OSSB025	OSSC025	OSSD025	OSSE025		
23	.023"		OSSA023	OSSB023	OSSC023	OSSD023	OSSE023		
24	.020"		OSSA020	OSSB020	OSSC020	OSSD020	OSSE020		

(ADD NO. OF TEETH TO CATALOG NUMBER WHEN ORDERING)

□□3/4" hole available at no extra cost on 2-3/4" O.D. x 72-teeth. (Available at extra cost on all others.)

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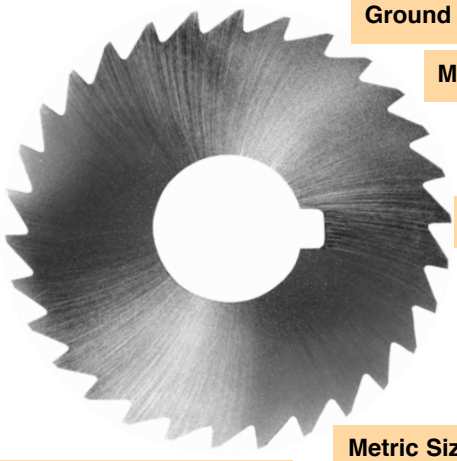
TYPE MSL — METAL SLITTING SAWS

Used for deep-slotting of Steel and Cast Iron — also cast Brass and Aluminum and similar hard non-ferrous metals. Has a stronger tooth and gives a better finish with less bur.



Ground Teeth

M-2 High Speed Steel

Hollow Ground For Side Clearance

Ground Land

Metric Sizes Available

Rake Angle of Teeth: 0°

NOTE:
Saws in schedule are stocked for immediate shipment. Intermediate thicknesses, use next higher price in schedule (plus a slight grinding charge for smaller quantities).
We'll gladly quote on other sizes, rake angles, tooth styles, hole sizes — just send us your print or sample saw.
Teeth can be alternately beveled if chips tend to stick in slot.

Thickness		O.D.	2-1/2"	3"	4"	5"	6"
		Hole	7/8"	1"	1"	1"	1"
Fraction	Decimal	No. of Teeth	28	30	36	44	50
3/16"	.1875"				OMSLE1875	OMSLF1875	OMSLG1875
5/32"	.1562"			OMSLD1562	OMSLE1562	OMSLF1562	OMSLG1562
1/8"	.1250"		OMSLH1250	OMSLD1250	OMSLE1250	OMSLF1250	OMSLG1250
3/32"	.0937"		OMSLH0937	OMSLD0937	OMSLE0937	OMSLF0937	OMSLG0937
1/16"	.0625"		OMSLH0625	OMSLD0625	OMSLE0625	OMSLF0625	OMSLG0625
3/64"	.0468"		OMSLH0468	OMSLD0468	OMSLE0468	OMSLF0468	OMSLG0468
1/32"	.0312"		OMSLH0312	OMSLD0312	OMSLE0312		

Tolerances: O.D. ±.005; Thickness ±.0005; I.D. +.001 -.000
Closer tolerances available at additional cost.

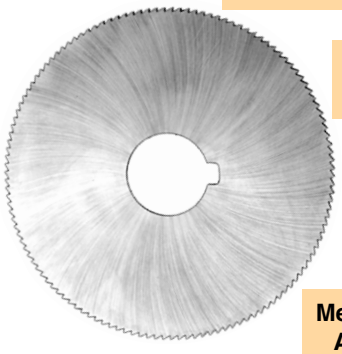
RESHARPENING SERVICE
Complete resharpening service is available. Prices on application.

COATING SERVICE
TiN, TiCN and other surface coatings are available. Prices on application.

HIGH-SPEED STEEL JEWELERS SLOTTING SAWS

Ground Teeth

Hollow Ground For Side Clearance



M-2 High Speed Steel

Rake Angle of Teeth: 0°

Metric Sizes Available

Tolerances: O.D. ±.005; Thickness ±.001; I.D. +.001 -.000
Closer tolerances available at additional cost.
(Keyways provided on 1/2" & 1" I.D. saws, of .020" thickness and up.)

STOCK SAWS

Thickness		O.D.	1-3/4"	2"	2-1/2"	3"	4"
B&S Gage No. and Fraction	Decimal	Hole	1/2"	1/2"	1/2"	*1/2", 1"	*1/2", 1"
		No. of Teeth	132, 160	110, 152	140, 190	170, 224	224, 300
15	.057"		OJA057	OJJ057	OJH057	OJD057	OJE057
16	.051"		OJA051	OJJ051	OJH051	OJD051	OJE051
3/64"	.047"		OJA047	OJJ047	OJH047	OJD047	OJE047
17	.045"		OJA045	OJJ045	OJH045	OJD045	OJE045
18	.040"		OJA040	OJJ040	OJH040	OJD040	OJE040
19	.036"		OJA036	OJJ036	OJH036	OJD036	OJE036
20	.032"		OJA032	OJJ032	OJH032	OJD032	OJE032
21	.028"		OJA028	OJJ028	OJH028	OJD028	OJE028
22	.025"		OJA025	OJJ025	OJH025	OJD025	OJE025
23	.023"		OJA023	OJJ023	OJH023	OJD023	OJE023
24	.020"		OJA020	OJJ020	OJH020	OJD020	OJE020
25	.018"		OJA018	OJJ018	OJH018	OJD018	OJE018
26	.016"		OJA016	OJJ016	OJH016	OJD016	OJE016
27	.014"		OJA014	OJJ014	OJH014	OJD014	OJE014
28	.012"		OJA012	OJJ012	OJH012	OJD012	OJE012
30	.010"		OJA010	OJJ010	OJH010	OJD010	OJE010
32	.008"		OJA008	OJJ008	OJH008	—	—

(ADD NO. OF TEETH TO CATALOG NUMBER WHEN ORDERING)

*** (3" & 4" O.D.'s WITH 1/2" HOLES, ADD "H" AFTER THE PART NO.)**

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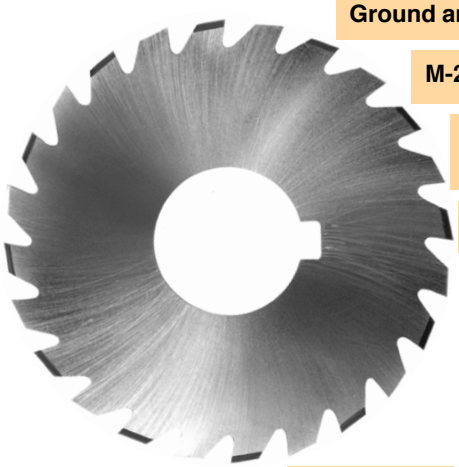
HIGH SPEED STEEL - TYPE SMF
COPPER SLITTING / RISER SLOTTING SAWS

Used for cutting rolled Aluminum and Copper — materials that produce long, stringy chips.



Ground and Landed Teeth

M-2 High Speed Steel

Hollow Ground For Side Clearance

Alternately Beveled Teeth

Alternately beveled teeth (see sketch) produce chips of less than the width of the slot being cut, eliminating the tendency of chips to clog.

NOTE:
For prices of thicknesses not shown, use next higher price in schedule (plus a slight grinding charge for smaller quantities). Other diameters, hole sizes , thicknesses, number of teeth, etc., also available on application.

Rake Angle of Teeth: 10° Positive

Metric Sizes

Thickness		O.D.	2-1/2"	3"	4"	5"	6"
		Hole	7/8"	1"	1"	1"	1"
Fraction	Decimal	No. of Teeth	20	24	26	32	36
3/16"	.1875"				OSMFE1875	OSMFF1875	OSMFG1875
5/32"	.1562"			OSMFD1562	OSMFE1562	OSMFF1562	OSMFG1562
1/8"	.1250"		OSMFH1250	OSMFD1250	OSMFE1250	OSMFF1250	OSMFG1250
3/32"	.0937"		OSMFH0937	OSMFD0937	OSMFE0937	OSMFF0937	OSMFG0937
1/16"	.0625"		OSMFH0625	OSMFD0625	OSMFE0625	OSMFF0625	OSMFG0625
3/64"	.0468"		OSMFH0468	OSMFD0468	OSMFE0468	OSMFF0468	OSMFG0468
1/32"	.0312"		OSMFH0312	OSMFD0312	OSMFE0312		

Tolerances: O.D. ±.005; Thickness ±.0005; I.D. +.001 -.000
Closer tolerances available at additional cost.

RESHARPENING SERVICE
Complete resharpening service is available. Prices on application.

COATING SERVICE
TiN, TiCN and other surface coatings are available. Prices on application.

HIGH SPEED STEEL PRECISION
RISER SLOTTING / COPPER SLITTING SAWS / (JOYAL®)

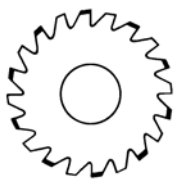
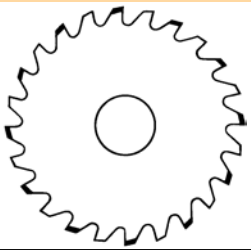
Used for slotting copper commutator risers and other materials that produce long, stringy chips.

The two styles of saws shown below are for Commutator Riser Slotting. These saws are precision ground on all surfaces; dimensions are shown under the actual size illustrations at right. Formed teeth are on center, with a 15° back-off and 45° alternate bevel which is 1/3 the width of the tooth. Saws are hollow-ground to provide clearance between the periphery and the hole.

	Catalog Number
W-75-20FAB, 7/8" x 5/16", 20 Teeth	OW7520__ __ __ (*Specify Thickness)
W-105-30FAB, 1-1/4" x 5/16", 30 Teeth	OW10530__ __ __ (*Specify Thickness)

*Saws are stocked in thicknesses from .010" through .069" in .001" increments.

Specify Thicknesses when ordering.
M-2 High Speed Steel.

Type W-75-20FAB	Type W-105-30FAB
7/8" O.D. x 5/16" I.D. 20 Teeth	1-1/4" O.D. x 5/16" I.D. 30 Teeth
	

Thickness tolerances are +.0000" -.0002".

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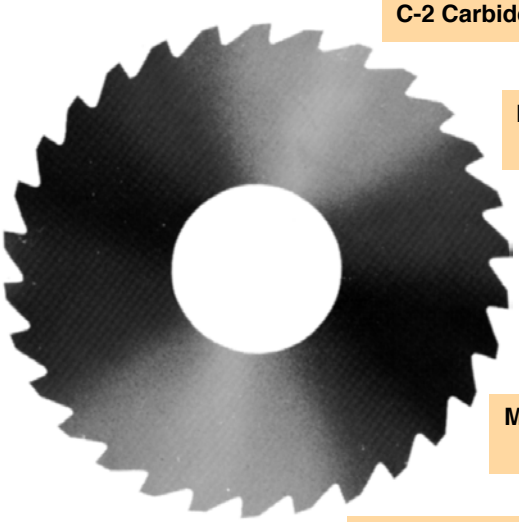
CARBIDE METAL-WORKING SAWS



C-2 Carbide

Hollow Ground For Side Clearance

Rake Angle of Teeth: 5°Positive

Metric Sizes Available

Carbide metal-working saw blades have steadily gained in popularity for many applications. Carbide, harder and more wear resistant than High-Speed Steel, provides longer tool life and decreased cycle times. Slotting, Slitting, Cut-Off and many other uses benefit from the use of solid carbide saw blades. A rigid set up with proper speed and feed, using correct coolant and tooth geometry for the application, will ensure optimum performance of your solid carbide saws. Contact our sales department to discuss the correct circular saw blade for your specific application.

SPECIALS: An almost endless number of variations from the tooth types and specifications shown below can be furnished to suit your exact needs and at comparable prices. Let us know your particular Carbide Metal-Working Saw Blade requirements so we can quote price and delivery.

Specify thickness and number of teeth when ordering.

Tolerances: O.D. ±.005; Thickness ±.0005; I.D. +.001 -.000
Closer tolerances available at additional cost.

	O.D.	1-1/2"	1-3/4"	1-3/4"	2"	2"	2-1/4"	2-1/4"	2-1/2"	2-3/4"	3"	4"	5"	6"
	HOLE	1/2"	1/2"	7/8"	1/2"	1"	5/8"	1"	1"	1"	1"	1"	1"	1"
Thickness Range	No. of Teeth	36	38	38	40	40	44	44	48	60	72	80	100	120
.010" - .019"		X1I	X1A	X1AA	X1J	X1JJ	X1B	X1BB	X1H	X1C	X1D	—	—	—
.020" - .030"		X2I	X2A	X2AA	X2J	X2JJ	X2B	X2BB	X2H	X2C	X2D	X2E	—	—
.031" - .050"		X3I	X3A	X3AA	X3J	X3JJ	X3B	X3BB	X3H	X3C	X3D	X3E	X3F	X3G
.051" - .070"		X4I	X4A	X4AA	X4J	X4JJ	X4B	X4BB	X4H	X4C	X4D	X4E	X4F	X4G
.071" - .090"		X5I	X5A	X5AA	X5J	X5JJ	X5B	X5BB	X5H	X5C	X5D	X5E	X5F	X5G
.091" - .110"		X6I	X6A	X6AA	X6J	X6JJ	X6B	X6BB	X6H	X6C	X6D	X6E	X6F	X6G
.111" - .130"		X7I	X7A	X7AA	X7J	X7JJ	X7B	X7BB	X7H	X7C	X7D	X7E	X7F	X7G
.131" - .150"		X8I	X8A	X8AA	X8J	X8JJ	X8B	X8BB	X8H	X8C	X8D	X8E	X8F	X8G
.151" - .170"		X9I	X9A	X9AA	X9J	X9JJ	X9B	X9BB	X9H	X9C	X9D	X9E	X9F	X9G
.171" - .190"		X10I	X10A	X10AA	X10J	X10JJ	X10B	X10BB	X10H	X10C	X10D	X10E	X10F	X10G
.191" - .210"		X11I	X11A	X11AA	X11J	X11JJ	X11B	X11BB	X11H	X11C	X11D	X11E	X11F	X11G
.211" - .230"		X12I	X12A	X12AA	X12J	X12JJ	X12B	X12BB	X12H	X12C	X12D	X12E	X12F	X12G
.231" - .250"		X13I	X13A	X13AA	X13J	X13JJ	X13B	X13BB	X13H	X13C	X13D	X13E	X13F	X13G

Teeth shown for general use. A wide range of teeth available.

Keyways are optional at extra cost.

Speed should be approximately 50% greater than HSS.

Specify thickness and number of teeth when ordering.

RESHARPENING SERVICE

Complete resharpening service is available. Prices on application.

COATING SERVICE

TiN, TiCN and other surface coatings are available. Prices on application.

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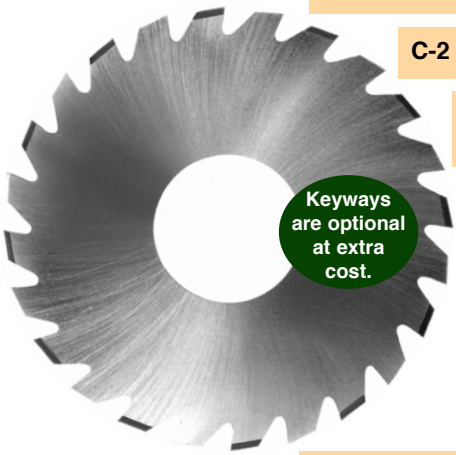
SOLID CARBIDE - TYPE SMF
COPPER SLITTING / RISER SLOTTING SAWS

Used for cutting rolled Aluminum and Copper — materials that produce long, stringy chips.



Landed Teeth

C-2 Carbide

Hollow Ground For Side Clearance

Alternately Beveled Teeth

Alternately beveled teeth (see sketch) produce chips of less than the width of the slot being cut, eliminating the tendency of chips to clog.

NOTE:
For prices of thicknesses not shown, use next higher price in schedule. Other diameters, hole sizes , thicknesses, number of teeth, etc., also available on application.

Thickness		O.D.	2-1/2"	3"	4"	5"	6"
		Hole	7/8"	1"	1"	1"	1"
Fraction	Decimal	No. of Teeth	20	24	26	32	36
3/16"	.1875"				XSMFE1875	XSMFF1875	XSMFG1875
5/32"	.1562"			XSMFD1562	XSMFE1562	XSMFF1562	XSMFG1562
1/8"	.1250"		XSMFH1250	XSMFD1250	XSMFE1250	XSMFF1250	XSMFG1250
3/32"	.0937"		XSMFH0937	XSMFD0937	XSMFE0937	XSMFF0937	XSMFG0937
1/16"	.0625"		XSMFH0625	XSMFD0625	XSMFE0625	XSMFF0625	XSMFG0625
3/64"	.0468"		XSMFH0468	XSMFD0468	XSMFE0468	XSMFF0468	XSMFG0468
1/32"	.0312"		XSMFH0312	XSMFD0312	XSMFE0312		

Rake Angle of Teeth: 10° Positive

Metric Sizes Available

Tolerances: O.D. ±.005; Thickness ±.0005; I.D. +.001 -.000
Closer tolerances available at additional cost.

Speed should be approximately 50% greater than HSS.

COATING SERVICE
TiN, TiCN and other surface coatings are available.
Prices on application.

RESHARPENING SERVICE
Complete resharpening service is available.
Prices on application.

SOLID CARBIDE PRECISION
RISER SLOTTING / COPPER SLITTING SAWS / (JOYAL®)

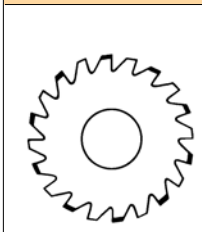
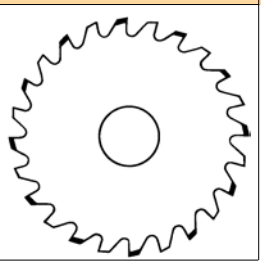
Used for slotting copper commutator risers and other materials that produce long, stringy chips.

The two styles of saws shown are for Commutator Riser Slotting.
These saws are precision ground on all surfaces; dimensions are shown under the actual size illustrations at right. Formed teeth are on center, with a 15° back-off and 45° alternate bevel which is 1/3 the width of the tooth. Saws are hollow-ground to provide clearance between the periphery and the hole.

	Catalog Number
W-75-20FAB, 7/8" x 5/16", 18 Teeth	TUNSW7518__ __ __ (*Specify Thickness)
W-105-30FAB, 1-1/4" x 5/16", 22 Teeth	TUNSW10522__ __ __ (*Specify Thickness)

*Saws are stocked in thicknesses from .010" through .069" in .001" increments.

Specify Thicknesses when ordering.
C-2 Solid Carbide.

Type W-75-18FAB	Type W-105-22FAB
7/8" O.D. x 5/16" I.D. 18 Teeth	1-1/4" O.D. x 5/16" I.D. 22 Teeth
	

Thickness tolerances are ± .0005".

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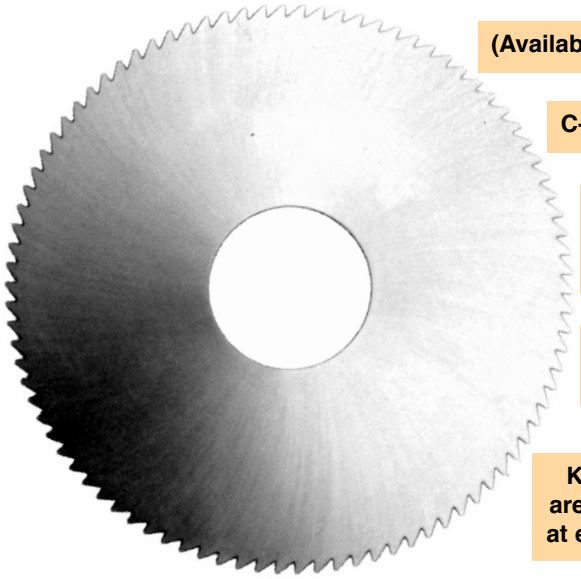
CARBIDE CUT-OFF SAWS



(Available in High-Speed Steel, upon request.)

C-2 Carbide

Hollow Ground For Side Clearance

Rake Angle of Teeth: 5°

Keyways are optional at extra cost

These saws are used for Rotary Cut-Off applications. The saws are made from C-2 Micro Grain Carbide and are produced to very close tolerances.

STOCK SAWS					
	O.D.	3”	3-1/2”	4”	4-1/4”
	Hole	1”	1”	1”	1”
Thickness	No. of Teeth	90, 120	90, 120	90, 120	90, 120
.064”		XSAD064	XSAK064	XSAE064	XSAO064
.045”		XSAD045	XSAK045	XSAE045	XSAO045
.032”		XSAD032	XSAK032	XSAE032	XSAO032

(ADD TO CATALOG NUMBER WHEN ORDERING: NO. OF TEETH, HIGH SIDE OF SHEAR ANGLE (R or L), AND DEGREE OF ANGLE.)

Tolerances: O.D. ±.005; Thickness ±.0005; I.D. +.001 -.000
Closer tolerances available at additional cost.

5 - 10° Cut-Off Angle (specify angle desired)

High Side Right, Top Teeth Coming (Regular)

- OR -

5 - 10° Cut-Off Angle (specify angle desired)

High Side Left, Top Teeth Coming (Reverse)

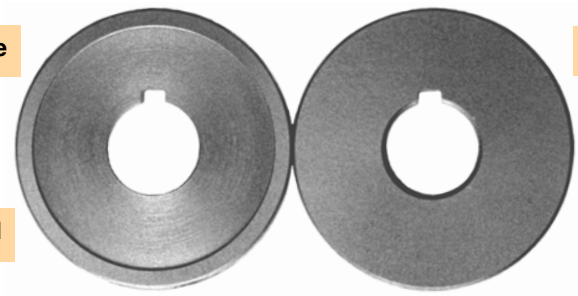
COATING SERVICE
TiN, TiCN and other surface coatings are available. Prices on application.

RESHARPENING SERVICE
Complete resharpening service is available. Prices on application.

SUPPORT WASHERS

Flanged Edge

Precision Ground



M-2 High-Speed Steel

Hardened

All saws, but especially those which are relatively thin, should be supported with as large as possible diameter flange support washers.
These side support washers distribute the clamping force evenly, provide additional stability, and lessen the chance for deflection in thinner blades.

Size			
O.D.	Thickness	I.D.	Catalog Number
2”	1/8”	1”	OWASH218K
3”	1/8”	1”	OWASH318K
3”	3/16”	1”	OWASH3316K

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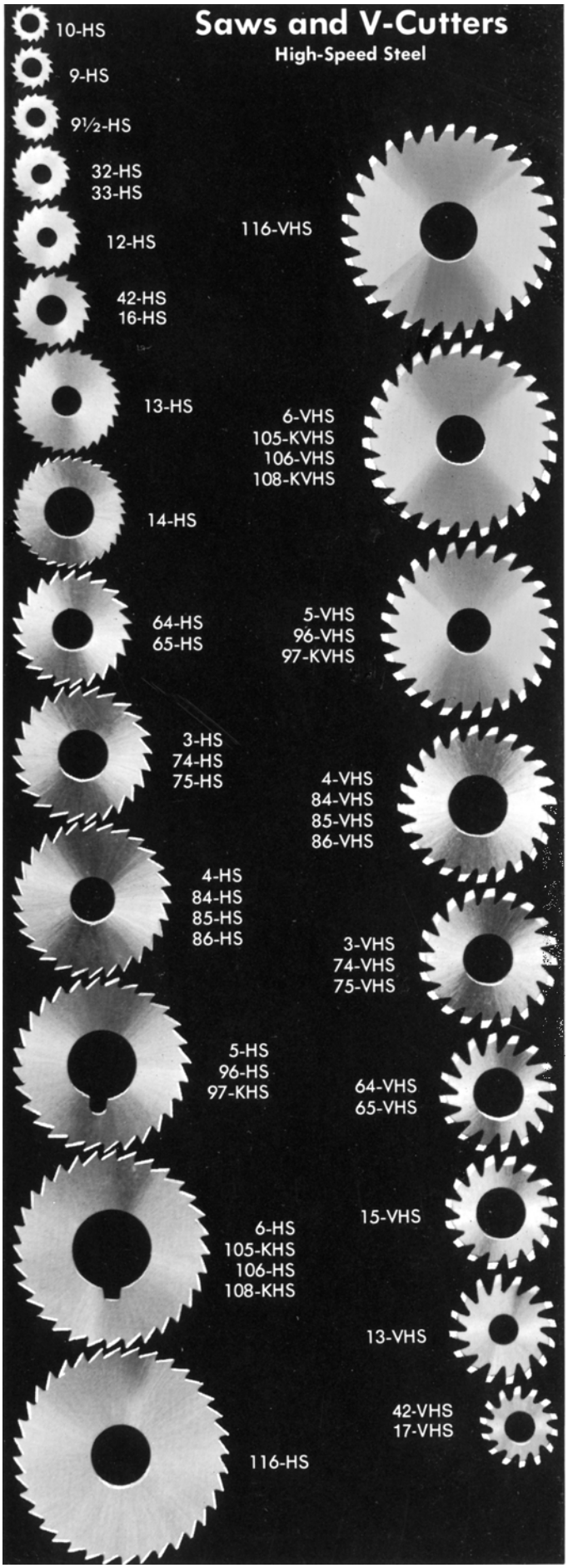


Martindale Undercutting Saws

GENERAL

Martindale Undercutting Saws and V-Cutters are available in High-Speed Steel or Tungsten-Carbide. Both types are carefully designed as to tooth form, hollow grind, hardness, etc., and are manufactured to close tolerances in our own plant.

While used primarily for undercutting mica and slotting risers of commutators, Martindale Undercutting Saws and V-cutters are also used for cutting steel, aluminum, plastics, and other materials not requiring set teeth.

Undercutting differs from ordinary machining in that, instead of shearing, it is a combination of crushing, grinding, and conveying. Mica is very abrasive and varies in hardness, making necessary the very best design and production controls in the manufacture of undercutting saws.

HIGH-SPEED STEEL SAWS and V-CUTTERS

These can be used on either portable or stationary equipment with spindle speeds of 1,500 to 5,000 r.p.m.

(See Martindale Mica Undercutters for 16 Undercutters.)

SAWS ("U"-Slot)

Actual size illustrations at left; specifications below. Saws stocked in these thicknesses:

.015" .018" .020" .023" .025" .026" .028" .030" .032" .035" .038" .040" .043" .045" .050" .053" .055" .058" .060" .063" .065"

(Other thicknesses available at extra cost.)

Be sure to specify thicknesses.

Type Number	O.D.	Hole	No. Teeth	Catalog Number
10-HS	1/4"	1/8"	14	HSMS10
9-HS	9/32"	1/8"	14	HSMS9
9-1/2-HS	5/16"	1/8"	16	HSMS9.5
32-HS	3/8"	1/8"	18	HSMS32
33-HS	3/8"	3/16"	18	HSMS33
12-HS	7/16"	1/8"	18	HSMS12
42-HS	1/2"	1/8"	18	HSMS42
16-HS	1/2"	3/16"	18	HSMS16
13-HS	11/16"	3/16"	28	HSMS13
14-HS	23/32"	5/16"	32	HSMS14
64-HS	3/4"	1/4"	22	HSMS64
65-HS	3/4"	5/16"	22	HSMS65
74-HS	7/8"	1/4"	24	HSMS74
3-HS	7/8"	9/32"	24	HSMS3
75-HS	7/8"	5/16"	24	HSMS75
84-HS	1"	1/4"	28	HSMS84
4-HS	1"	9/32"	28	HSMS4
85-HS	1"	5/16"	28	HSMS85
86-HS	1"	3/8"	28	HSMS86
5-HS	1-1/8"	9/32"	28	HSMS5
96-HS	1-1/8"	3/8"	28	HSMS96
97-KHS	1-1/8"	7/16"	28	HSMS97K
6-HS	1-1/4"	9/32"	32	HSMS6
105-KHS	1-1/4"	5/16"	32	HSMS105K
106-HS	1-1/4"	3/8"	32	HSMS106
108-KHS	1-1/4"	1/2"	32	HSMS108K
116-HS	1-3/8"	3/8"	36	HSMS116

Metric Sizes
25 mm. O.D. x 7mm. I.D. Saws in stock, along with other metric sizes upon request.

V-CUTTERS ("V"-Slot)

Actual size illustrations at left; specifications below. These cutters are all .045" thick and stocked with 40°, 50°, and 60° angles between cutting edges. 40° V-cutters are for thin mica, 50° for medium mica, 60° for thick mica.

Be sure to specify angle 40°, 50°, or 60°.

Type Number	O.D.	Hole	No. Teeth	Catalog Number
42-VHS	1/2"	1/8"	12	HSMSV42
17-VHS	1/2"	3/16"	12	HSMSV17
13-VHS	11/16"	3/16"	14	HSMSV13
15-VHS	23/32"	5/16"	14	HSMSV15
64-VHS	3/4"	1/4"	14	HSMSV64
65-VHS	3/4"	5/16"	14	HSMSV65
74-VHS	7/8"	1/4"	18	HSMSV74
3-VHS	7/8"	9/32"	18	HSMSV3
75-VHS	7/8"	5/16"	18	HSMSV75
84-VHS	1"	1/4"	22	HSMSV84
4-VHS	1"	9/32"	22	HSMSV4
85-VHS	1"	5/16"	22	HSMSV85
86-VHS	1"	3/8"	22	HSMSV86
5-VHS	1-1/8"	9/32"	24	HSMSV5
96-VHS	1-1/8"	3/8"	24	HSMSV96
97-KVHS	1-1/8"	7/16"	24	HSMSV97K
6-VHS	1-1/4"	9/32"	24	HSMSV6
105-KVHS	1-1/4"	5/16"	24	HSMSV105K
106-VHS	1-1/4"	3/8"	24	HSMSV106
108-KVHS	1-1/4"	1/2"	24	HSMSV108K
116-VHS	1-3/8"	3/8"	26	HSMSV116

Metric Sizes
25 mm. O.D. x 7mm. I.D. V-Cutters in stock, along with other metric sizes upon request.

See “General” discussion of Undercutting Saws on page 10.

TUNGSTEN-CARBIDE SAWS and V-CUTTERS

The teeth of both saws and V-cutters have a slight land to give strength to the cutting edge. Saws are hollow-ground for clearance, V-cutters have ample radial relief. When Carbide Saws are used on other equipment than our undercutters, steel supporting washers are recommended to reduce breakage. Spindle speeds may vary from 3,000 to 12,000 r.p.m., depending on Saw O.D. Martindale Carbide Saw Blades are harder than High Speed Steel Saws, therefore more brittle and should not be subjected to apllications where shock may shorten the service life. Use on rigid stationary equipment.

See Undercutters for 9 Martindale Undercutters for use with these saws: Close-Cut, Kut-Kwik, Utility, Bench-Type Model HV-3, Lathe-Type and Super Lathe-Type, Heavy-Duty Bench-Type Model H-9, Industrial Model HA-2, and Model UL Lathe Mounted Automatic.

SAWS (“U”-Slot)

Actual size illustrations; specifications below. Thickness ranges as follows:

1/4” - 9/16” O.D. from .010” to .045” thick
5/8” - 1-3/8” O.D. from .010” to .065” thick

Be sure to specify thicknesses.

Type Number	O.D.	Hole	No. Teeth	Catalog Number
10-TC	1/4”	1/8”	12	TUNS10
9-1/2-TC	5/16”	1/8”	14	TUNS9.5
32-TC	3/8”	1/8”	14	TUNS32
33-TC	3/8”	3/16”	14	TUNS33
12-TC	7/16”	1/8”	14	TUNS12
42-TC	1/2”	1/8”	14	TUNS42
16-TC	1/2”	3/16”	14	TUNS16
18-TC	9/16”	1/4”	16	TUNS18
54-TC	5/8”	1/4”	16	TUNS54
64-TC	3/4”	1/4”	18	TUNS64
65-TC	3/4”	5/16”	18	TUNS65
75-TC	7/8”	5/16”	20	TUNS75
4-TC	1”	9/32”	20	TUNS4
84-TC	1”	1/4”	20	TUNS84
85-TC	1”	5/16”	20	TUNS85
86-TC	1”	3/8”	20	TUNS86
95-TC	1-1/8”	5/16”	22	TUNS95
96-TC	1-1/8”	3/8”	22	TUNS96
105-TC	1-1/4”	5/16”	24	TUNS105
106-TC	1-1/4”	3/8”	24	TUNS106
108-TC	1-1/4”	1/2”	24	TUNS108
116-TC	1-3/8”	3/8”	24	TUNS116

COMPOUND-LAND SAWS

The compound-land feature, sketched at right, is available on tungsten-carbide “U”-slot saws 9/16” O.D. and up (#18-TC thru #116-TC) at a 30% premium in price. Because of this feature, each tooth cuts only 50% of full slot width, resulting in better chip clearance, cooler operation and production increases of up to 60% over the square-toothed Saw. To order, add “CL” to Catalog Number. Minimum thickness .015”.

V-CUTTERS (“V”-Slot)

Actual size illustrations; specifications below. Thickness ranges as follows:

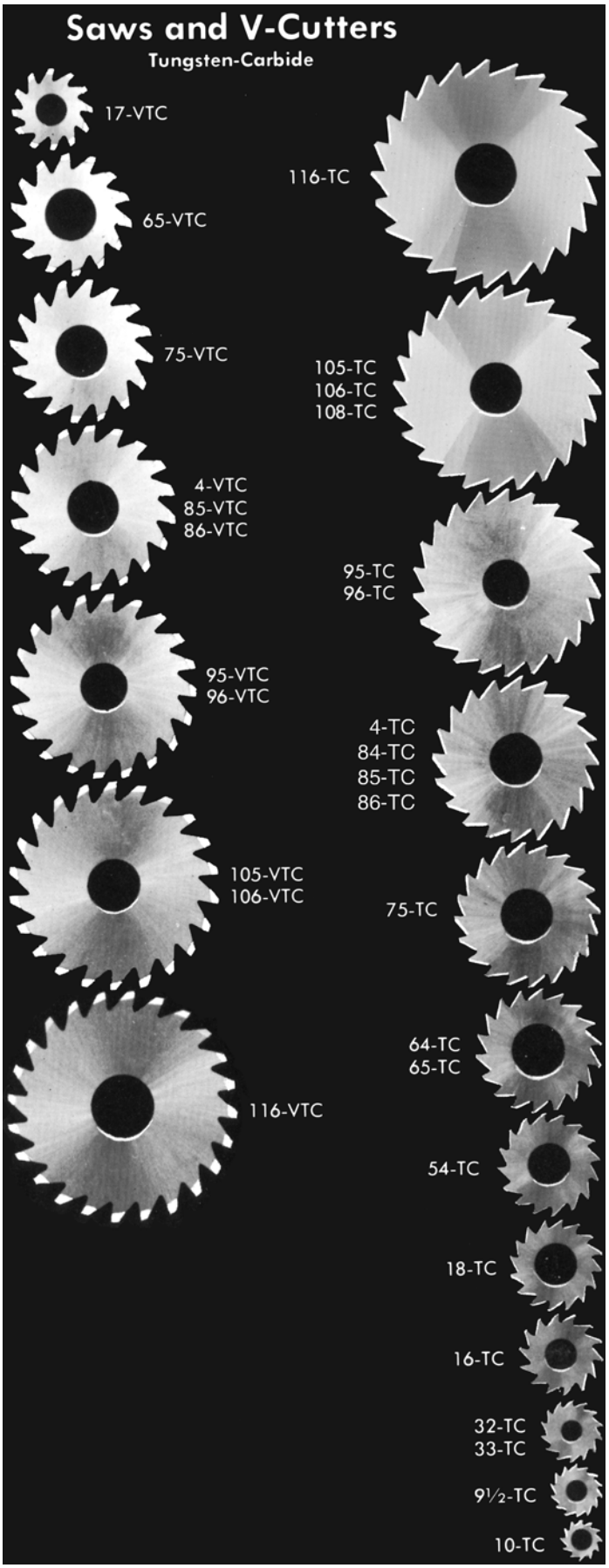
1/2” O.D. from .030” to .045” thick
3/4” - 1-3/8” O.D. from .030” to .065” thick

Angles between cutting edges can be 40°, 50°, and 60°. 40° V-cutters are for thin mica, 50° for medium mica, 60° for thick mica.

Be sure to specify thicknesses and angle, 40°, 50° or 60°.

Type Number	O.D.	Hole	No. Teeth	Catalog Number
42-VTC	1/2”	1/8”	12	TUNSV42
17-VTC	1/2”	3/16”	12	TUNSV17
65-VTC	3/4”	5/16”	14	TUNSV65
75-VTC	7/8”	5/16”	16	TUNSV75
4-VTC	1”	9/32”	18	TUNSV4
85-VTC	1”	5/16”	18	TUNSV85
86-VTC	1”	3/8”	18	TUNSV86
95-VTC	1-1/8”	5/16”	20	TUNSV95
96-VTC	1-1/8”	3/8”	20	TUNSV96
105-VTC	1-1/4”	5/16”	22	TUNSV105
106-VTC	1-1/4”	3/8”	22	TUNSV106
116-VTC	1-3/8”	3/8”	22	TUNSV116

SPECIALS — Your inquiries are invited for sizes not listed on the H.S.S. or Tungsten-Carbide Saw Pages.

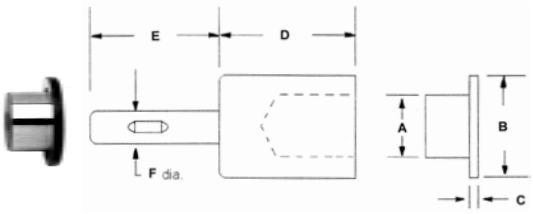


SAW ARBORS

General purpose slitting/slotting saw arbors. Hardened all over (58/60 Rc) for added toughness on cutter locating surfaces and shanks. Shanks ground to within .001 T.I.R. of cutter location diameter. Extra long, strong body with protective black oxide finish. Super low profile on caps allows cutter to reach areas inaccessible with conventional arbors. Stout plug: extra support, less vibration. Weldon style shanks.

Martindale now offers a Gold Series reach arbor. These arbors are heat treated and ground to .0004" T.I.R. concentricity and squareness. They are engineered for use with carbide cutters or where accuracy is a must. This VIBRA-CORE design, along with the deep low profile caps, gives extra support and less vibration.

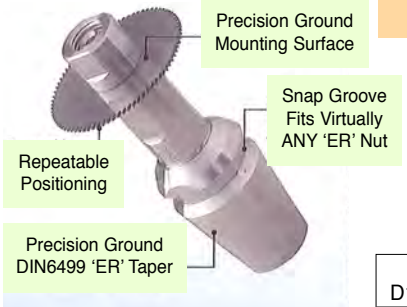
General Purpose Series



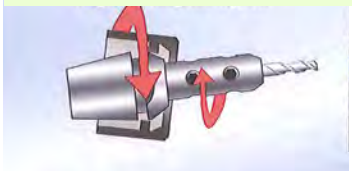
Gold Star Presicion Series

A	B	C	D	E	F	General Purpose Catalog Number	Gold Series Catalog Number
0.250	0.500	.080	1.000	1.700	.500	ARBR0250	ARBR0250P
0.375	0.625	.080	1.180	1.700	.500	ARBR0375	ARBR0375P
0.500	0.750	.095	1.370	1.700	.500	ARBR0500	ARBR0500P
0.625	1.000	.122	1.500	2.030	.750	ARBR0625	ARBR0625P
1.000	1.500	.160	1.750	2.030	.750	ARBR1000	ARBR1000P

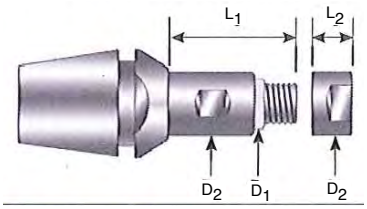
SAW ARBORS with ER16 Taper - Ti-Loc® Swiss Clamp System


Precision Ground Mounting Surface
Snap Groove Fits Virtually ANY 'ER' Nut
Repeatable Positioning
Precision Ground DIN6499 'ER' Taper

Twist and snap into any ER clamping nut. No special holding nuts required!



Taper Integrated Tooling for Advanced Productivity



D1	D2	L1	L2	Taper	Catalog Number
0.125"	6.4mm	25mm	9mm	ER16	ARBR318064250
0.125"	6.4mm	32mm	9mm	ER16	ARBR318064320
0.187"	9.5mm	25mm	9mm	ER16	ARBR476095250
0.187"	9.5mm	32mm	9mm	ER16	ARBR476095320
0.250	9.5mm	25mm	9mm	ER16	ARBR635095250
0.250"	9.5mm	32mm	9mm	ER16	ARBR635095320
0.312"	10mm	25mm	9mm	ER16	ARBR794100250
.0312"	10mm	32mm	9mm	ER16	ARBR794100320
Recommended Maximum Saw Thickness ~ .080"					

- Can be used in any machine that has ER collet live tooling.
- ER 16 taper arbors serve as their own collet, eliminating need for two piece arbor system.
- One piece design adds rigidity of set-up and improves total indicated run-out (TIR).
- Less expensive & more cost effective than comparable two piece arbor systems.

GRINDING WHEEL

For Circular Saw Sharpening

For those who have indicated an interest in resharpening their own screw slotting saws. Many have found this wheel/spec to work well for sharpening the teeth of dull, hardened metal working saws, thereby giving new life to blades otherwise considered no longer useful.

Of course we offer a resharpening service for those who don't want to do the work themselves.

8" x 3/16" x 1-1/4" or 8" x 3/16" x 3/4" with hole reducer.

Catalog Number

Grinding Wheel GRWHV13

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Helpful Hints For Saw Users (H.S.S. Metal-Working Saws)

These are general suggestions for conventional machines on where to start, and must be varied to meet a particular application. We do not assume any liability in the following statements.

These STOCK saws will do the job. Variations, such as number of teeth, rake angle, clearance angle, bevel, side clearance, material, land, etc. may do it better, but set-up charges and lead time must be considered.

SPEEDS — With a good set-up the speeds in the table below should be attainable
— Reduce the speed for hard (over Rockwell c30) and abrasive materials, and for deep cuts.
— Increase the speed for "free-machining" and non-ferrous metals.

Saws: M-2 Steel, Ground Teeth, 0° Rake Angle

Material to be cut	Saw Diameter: 1-3/4" Teeth - R.P.M.	2-1/4" Teeth - R.P.M.	2-3/4" Teeth - R.P.M.	3" Teeth - R.P.M.	4" Teeth - R.P.M.	Coolant
Mild Steel	64 - 450	60 - 350	56 - 275	56 - 250	72 - 200	Cutting Oil
Alloy Steel	64 - 200	60 - 175	56 - 150	56 - 125	72 - 100	"
Stainless Steel	64 - 200	60 - 175	56 - 150	56 - 125	72 - 100	"
Steel Castings	64 - 200	60 - 175	44 - 150	44 - 125	60 - 100	"
Steel Forgings	64 - 450	60 - 350	56 - 275	56 - 250	72 - 200	"
Monel	64 - 200	60 - 175	56 - 150	56 - 125	72 - 100	"
Aluminum	64 - 2000	60 - 1750	44 - 1350	44 - 1250	60 - 950	Soluble Oil
Bronze	64 - 750	60 - 600	44 - 500	44 - 450	60 - 350	"
Yellow Brass	64 - 2500	60 - 2000	44 - 1600	44 - 1500	60 - 1100	"
Copper	64 - 1750	60 - 1350	44 - 1100	44 - 1000	60 - 750	"
Malleable Iron	64 - 350	60 - 250	56 - 200	56 - 200	72 - 150	"
Cast Iron	64 - 450	60 - 350	44 - 275	44 - 250	60 - 200	Dry
Die Castings	64 - 2500	60 - 2000	44 - 1600	44 - 1500	60 - 1100	"
Brittle Plastics	64 - 1000	60 - 900	56 - 700	56 - 650	72 - 500	"
Flexible Plastics	Use Set Teeth (Hub saw with maximum side clearance for very thin cuts)					

(There should be at least 2 teeth engaged in the cut.)

Increase Number of Teeth For:
- **Thin Material**
- **Thin Cuts (under .025")**
- **Slow Spindle Speeds**
- **Hard Material**
- **Sandy Castings**
- **Thin Castings**
- **Work Hardened**
- **Hard Spots**

Decrease Number of Teeth For:
- **Chip Clearance and Tooth Strength (Consider MSL & SMF type saws.)**
- **Deep Cuts (over 1/4")**
- **High Speeds**
- **Free Cutting Material**

FEEDS — will vary from .0002" to .002" per tooth. We suggest starting with the cutter described above and trying to arrive at the condition described under "Cutting Fluids" by varying the Feed and Speed. A straw color is the limit. The saw loses its temper when it starts turning blue.

CUTTING FLUIDS — (to cool, lubricate, and wash the chips away. Use Flood. Do not use Mist Units.)
Cutting Oil — Follow Manufacturer's Instructions - or - use a 4% sulphur homogenized cutting oil.
Soluble Oil — Follow Manufacturer's Instructions - or - use 40-1 solution of soluble oil — (Mix thoroughly in a 4 - 1 solution before adding to tank.) **Increase speed and feed until the lubricant starts to give off a slight vapor (smoke).** Frequently saws are run too slow, causing rubbing and premature wear.

DISH — (Side-Clearance or Hollow Grind) Increase it for stainless steel and tenacious metals such as copper, zinc, tin or lead.

MOUNTING OF SAWS — Breakage — Wobble — Rubbing: These problems may be caused by the way the washers are mounted on either side of the saw. — Washers drive the saw, in the absence of a driving key, and must always be clean, flat and bur-free. A speck of dirt will let the saw wobble and cut oversize. If a saw breaks, it may score the washers. Check marks around the saw hole for: Dirt, Shiny Spots (as small as a pinpoint, indicating chips imbedded under the washers), and Circular Skid Marks, which indicate the nut is not tight. — Thin saws should especially be supported by washers as large as possible. — Nut must be wrench-tight. — If the saw blade pauses momentarily in its rotation while the feed advances, it will break. — Washers must be of equal diameter or they will flex out the dish and cause one side of the teeth to rub.

Continued Next Page

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Helpful Hints For Saw Users (H.S.S. Metal-Working Saws)

(Continued)

TEETH — Deep cuts and soft material require fewer teeth (for chip clearance) and stronger teeth (landed). — Thin material requires more teeth (at least 2 teeth engaged in cut). — Hard materials and narrow slots (under .025") likewise require more teeth. — Alternately beveled teeth keep chips from sticking in the cut and in the tooth gullets. — Rake Angles: On center for iron and steel, 5° negative for yellow brass, from 5° to 10° positive for other soft materials.

BREAKAGE — In addition to causes noted under "MOUNTING OF SAWS": Teeth break when starting a cut at too fast a feed, spindle bearings worn, drive belts loose or sheaves worn, indexing before saw has cleared the slot, work-piece not tight, or the saw is dull (even the best eventually wear out).

KEYWAYS — No keyways are furnished on saws under .020". Thin saws will warp in the heat treating and grinding processes. Locked up between good supporting washers, they will run true.

HUBS — will allow maximum side clearance when attempting to cut wood or plastics. They are helpful when spacing saws on an arbor.

RESHARPENING — In addition to grinding the tips of the teeth, all marks must be removed from the sides of the teeth. This can be done by grinding the diameter below the marks or, as we do, by grinding the tips and clean-up grinding the sides. Either way the thickness is reduced because of the hollow grind that is necessary for even the shallowest of cuts.

VIBRATION AND CHATTER — Arbor bent or worn undersize. — Work-piece improperly supported, particularly watch on thin material. — Teeth too coarse/fine. — Speed too slow. — Climb milling, "Up-milling" is preferred, but climb milling may help on small parts to keep them from being ripped from the clamping fixture. It may also reduce the bur. — Dull tool / Wrong clearance angles. — Feed too slow.

EXCESSIVE WEAR — Seizing: Not enough coolant in the right place. — Not enough side clearance. — Cutter speed too fast and feed too slow. The work may glaze and the saw will rub.

TOLERANCES — are expensive, don't over-specify.

STEELS — M-2 is the best if the set-up is proper. We do have available saws from M-42 along with various surface treatments such as Titanium Nitride.

SUGGESTION — If a saw is working well, send it to us and we will duplicate it. — If a saw is not working well, send us a used blade. We can some times make recommendations from the marks on the saw.

Helpful Hints For Saw Users

(Mica Undercutting Saws & V-Cutters)

COMMUTATOR UNDERCUTTING

After the commutator has been satisfactorily resurfaced, the mica insulation separating the copper segments must be undercut. Undercutting is one operation that is most easily accomplished with the armature removed from the machine. Various tools are available, however, that enable undercutting to be performed on a commutator "in place" without undue hardship.

Of the various undercutting practices used, only the two most common methods will be discussed herein.

There are three basic types of slots that can be produced by the use of circular cutters. The U-slot, the V-slot and the Compound-angle slot.

Continued Next Page

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Helpful Hints For Saw Users

(Mica Undercutting Saws & V-Cutters) (Continued)

U-SLOT

The U-slot (as shown in Fig. 1) is generally preferred if the slots are accessible for easy cleaning. These slots have the advantage, if done carefully, of being effective until the commutator has worn down the full depth of the undercut. The slot should be cut to a depth of 1/32 (.032) inch, or not more than 3/64 (.046) inch. If cut too deep, accumulated dust will not be thrown out by the centrifugal action of the rotating commutator.

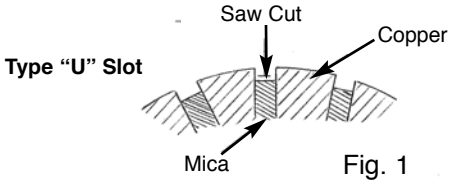


Fig. 1

When using a circular cutter, the width of the cutter is chosen to exceed slightly the thickness of the mica. It is recommended that the SAW THICKNESS be figured on the basis of the mica thickness plus .003" (.08mm). This will allow the saw to remove the full width of the mica pus .0015" (.04mm) of copper on each side of the mica slot. If unable to determine the mica width, the use of a feeler gauge can best determine the required saw thickness. Consequently, some copper is cut or dragged off the bar during undercutting, (as shown in Fig. 2).

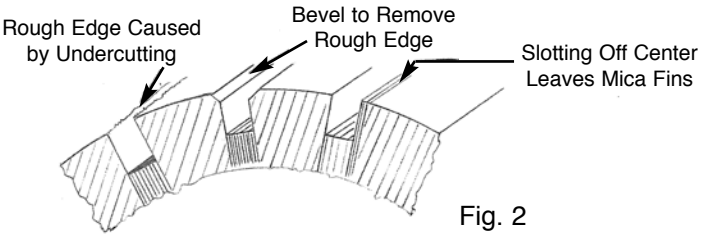


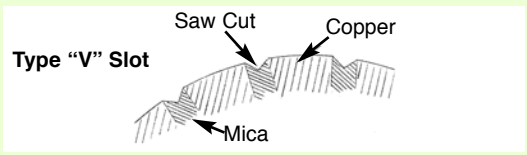
Fig. 2

In addition to leaving a jagged edge projecting from the commutator bar, the edge of the bar becomes somewhat work-hardened and hence will not wear down uniformly. Therefore, the edges of the bars must be chamfered by using a suitable slotting file or a specialty shaped scraper. ** See Martindale slotting scrapers. **

A chamfered face of approximately 1/64 inch is usually adequate to remove any roughness or edge hardening that could be disturbing to the brush faces.

V-SLOT

V-slots keep slots free from dust accumulations at low speeds, and do not require a separate operation for chamfering of the bar edges. V-slots are usually made with either a slotting file, or a "V" tooth circular cutter.
Usual practice is to use a circular cutter having an included angle between cutting edges such that a cut made 1/16 inch deep will also leave 1/32 inch free copper above the mica. The "V" tooth circular cutter are available with 40°, 50° or 60° angles between the cutting edges.



Continued Next Page

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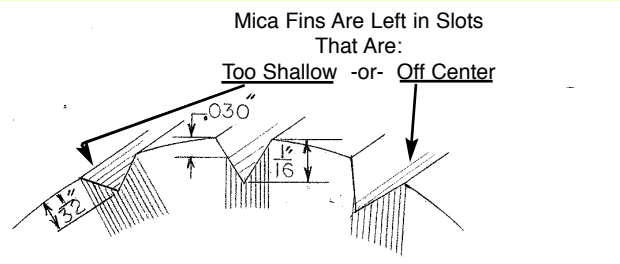
Helpful Hints For Saw Users

(Mica Undercutting Saws & V-Cutters) (Continued)

To obtain a 1/16 inch deep cut with 1/32 inch free copper above the mica, the following table may be used:

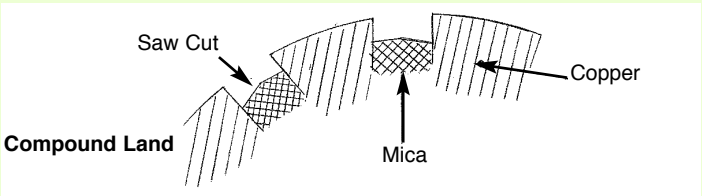
Thickness of Mica	Angle of "V"-cutter
.023 inch	40°
.029 inch	50°
.036 inch	60°

The necessity of accurately centering the circular cutter on the mica is readily apparent. Mica fins in V-slots being wedge-shaped, are more difficult to remove than the fins of uniform thickness left at the sides of U-slots by inaccurate centering of the circular cutter.



COMPOUND LAND

The teeth on the compound land mica saw are alternately ground to a special taper which reduces the impact on each individual tooth and produces chips of just slightly over half the width of the mica slot thereby eliminating the tendency to clog. When undercutting with a compound land saw the bottom of the slot will appear to be flat. However, as a result of the reverse taper on alternate teeth, the slot will have a slight pyramid or convex surface. This type of saw operates cooler and cleans better thereby prolonging the saw life with resulting economy to the user.



After a commutator has been undercut, it should be very carefully inspected to assure that all copper particles have been removed, that the bars have been carefully chamfered, and that all sharp edges and burs have been eliminated. Then each slot should be individually checked and reworked as necessary to remove any traces of fin or side mica.

Finally, the surface should be lightly polished with a fine-grain commutator stone. **A more popular method is the use of a rubber bond cleaning stone, which will properly finish the surface and leave the proper filming required.